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International Patent Application PCT/EP02/07010

Borealis Technology Oy

New claims:

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1. A process for the preparation of a polypropylene polymer composition with bimodal rubber, said process comprising the steps of:
 - i) feeding propylene to a at least one slurry reactor and producing a polypropylene polymer matrix in the presence of a polymerisation catalyst in said at least one slurry reactor,
 - ii) transferring the slurry reactor product into a gas phase reactor (GPR),
 - 15 iii) feeding a first mixture of ethylene and propylene to said first gas phase reactor and producing a first ethylene/propylene-copolymer in the polymer matrix in the presence of a polymerisation catalyst in said first gas phase reactor,
 - iv) transferring the first gas phase reactor product into a second gas phase reactor, and
 - v) feeding a second mixture of ethylene and propylene to said second gas phase reactor and producing a second ethylene/propylene-copolymer in the polymer matrix in the presence of a polymerisation catalyst in said second gas phase reactor,
 - 25 vi) recovering the polymer product produced in step v) for further processing,
- 30 said first and second ethylene/propylene mixtures having different composition ratios and wherein said first ethylene/propylene-copolymer has a higher molecular weight than said second ethylene/propylene-copolymer.

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2. Process according to claim 1 wherein the composition ratios of said first and second ethylene/propylene mixtures are adjusted so that in the first gas phase reactor, a propylene rich EPR rubber is produced in the propylene polymer matrix, and in the second gas phase reactor, a ethylene rich EPR rubber is produced in the propylene polymer matrix.
3. Process according to any of claims 1 or 2, whereby the polymerisation conditions in the gas phase reactors are such that in one GPR reactor A, the gas phase polymerisation step is carried out by adding propylene and ethylene monomers where the resulting amount of C₂ in the EPR formed in gas phase reactor A is in the range from 39 - 74 mol%, preferably 53 - 65 mol% and that in the other GPR reactor B, the gas phase polymerisation step is carried out by adding propylene and ethylene monomers where the resulting amount of C₂ in the EPR formed in gas phase reactor B is in the range from 77 - 99,9 mol%, preferably 84 - 96 mol%.
4. Process according to claim 3, whereby in GPR reactor A, the molar H₂/C₂ ratio is in the range between 0,01 to 0,1, preferably 0,03 to 0,06 and most preferably 0,05 and in GPR reactor B, the molar H₂/C₂ ratio is in the range between 0,3 to 0,7, preferably 0,4 to 0,6 and most preferably 0,5.
5. Process according to any of the preceding claims, whereby the polymer products are flashed before transferring them to the next polymerisation step.

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6. Process any of the preceding claims, whereby the first and second GPR polymerisation steps are carried out in the same gas phase reactor.

5 7. Process according to any of the preceding claims, whereby the polymer product obtained in step vi is further treated for compounding with additives and/or fillers.

10 8. Polymer product obtainable according to the process of any of the preceding claims.

9. Polymer product according to claim 8, further comprising at least one additive or filler selected from minerals, slip agent and processing agents.

15 10. Polymer product obtainable according to the process of any of the preceding claims and having a dL value of less than 4, preferably less than 2.

20 11. Use of the polymer of claims 8 to 10 for manufacturing moulded articles.

12. Moulded article, comprising the polymer of any of claims 8 to 10.